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IS 13046 (1991): Sweet Potato Flour [FAD 16: Foodgrains, Starches and Ready to Eat Foods]

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भारतीय मानक

शकरकन्द का आटा — विशिष्टि

Indian Standard

SWEET POTATO FLOUR — SPECIFICATION

UDC 664·641·2-492·2

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1991 **Price Group 3**

Edible Starches and Starch Products Sectional Committee, FADC 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Edible Starches and Starch Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Sweet potato flour is obtained from the tubers of *Ipomoea batata.* It is used in puddings, bakery products, textiles and fermentation industries. Sweet potatoes of both white and yellow fleshed varieties are available. However, the white fleshed varieties are generally used for making the flour.

While formulating this standard, the committee responsible for its preparation gave due weightage to the available data on its composition. Further, due consideration was given to the relevant Rules prescribed in the *Prevention of Food Adulteration Act 1954* and *Weight and Measures (Packaged Commodities) Rules, 1977.* However this standard is subject to the restriction imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SWEET POTATO FLOUR—SPECIFICATION

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for sweet potato flour.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, sweet potato flour shall mean the flour obtained by grinding and drying of the tuber of *Ipomoea batata* adopting good manufacturing practices.

4 REQUIREMENTS

4.1 Description

The material shall be in the form of a fine powder and shall be white in colour. It shall be free from rancidity, adulterants, rodent contamination, insect or fungus infestation and from fermented, musty or any other objectionable odour. It shall not contain any other added sweetening, flavouring, colouring agent or any other foreign matter.

4.2 Microscopic Appearance

When the material is subjected to microscopic examination [*see* **4** of IS 4706 (Part 1) : 1978] the starch granules shall have the characteristic appearance as shown in the photomicrograph reproduced in Fig. 1. The granules shall have a polygonal form, most of them in the size range of 10-25 micron.

4.3 The material, when examined by the method prescribed in **6** of IS 4706 (Part 1) : 1978, shall be free from dirt and other suspended extraneous matter.

4.4 Particle Size

When tested by the method prescribed in **3** of IS 4706 (Part 1) : 1978 not more than 2 percent by mass of the material shall be retained on a 100-micron IS Sieve and not more than 0·5 percent by mass of the material shall be retained on a 200-micron IS Sieve.

NOTE — Use 100 and 200 micron IS Sieve in place of 75 and 150 micron IS Sieve given in 3 of IS 4706 (Part 1) : 1978.

4.5 Hygienic Conditions

The material shall be processed and packed under hygienic conditions described in IS 2491 : 1972.

4.6 The material shall also comply with the requirements given in Table 1.

5 PACKING

5.1 Unless, otherwise, agreed to between the purchaser and the supplier, the material shall be packed in clean, sound and new A-Twill jute bags (*see* IS 1943 : 1964), lined with polyethylene. The mouth of each bag shall be either machine-stitched or rolled over and hand-stitched in a secure manner.

5.2 The material may also be packed in smaller containers lined with paper or polyethylene.

6 MARKING

6.1 Each container shall be suitabley marked with indelible and insoluble ink, giving following information:

a) Name of the material;

b) Indication of source of manufacture;

c) Batch or code number;

d) Date of manufacture;

e) Net mass; and

f) Any other details as are required under the standards of *Weights and Measures (Packaged Commodities) Rules, 1977* and *Prevention of Food Adulteration Rules, 1955.*

7 SAMPLING

The representative sample of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the procedure prescribed in IS 4662 : 1977.

8 TESTS

8.1 Tests shall be carried out by the methods specified in col 4 and 5 of Table 1.

8.2 Quality of Reagents

Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (*see* IS 1070 : 1977) shall be used where the use of water as a reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

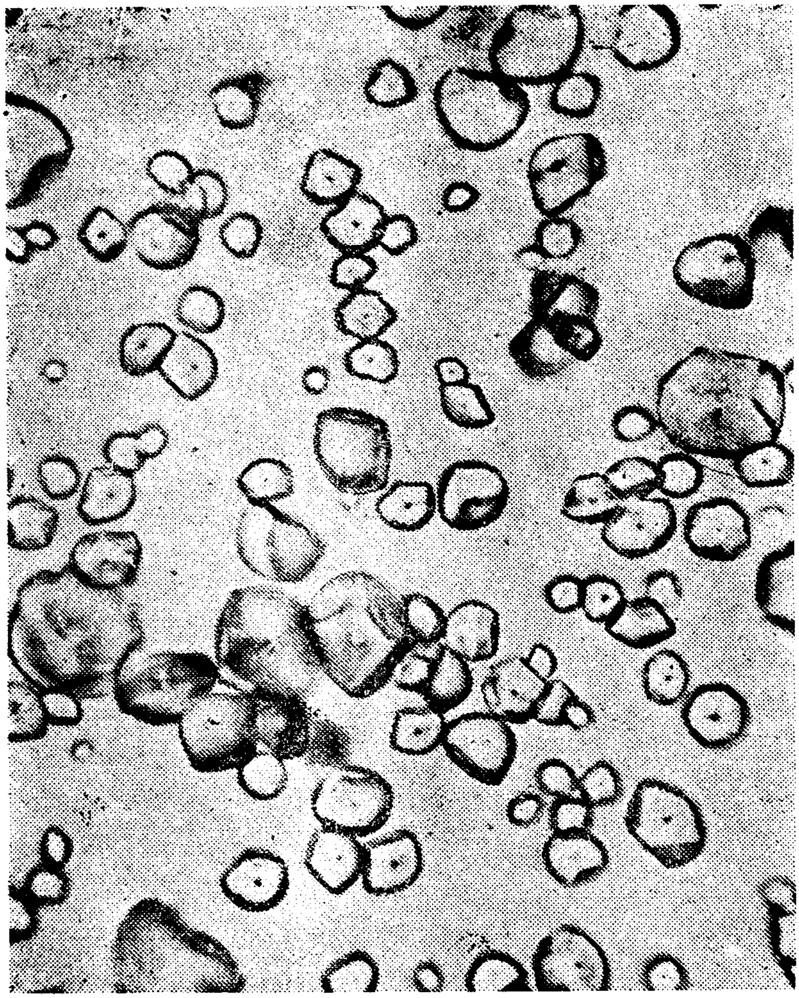

FIG. 1 PHOTOMICROGRAPH OF SWEET POTATO FLOUR

Table 1 Requirements for Sweet Potato Flour

(*Clauses* 4.6 and 8.1)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Cl No. of IS 4706 (Part 2) : 1978	Other Standard
(1)	(2)	(3)	(4)	(5)
i)	Moisture, precent by mass, *Max*	10·0	4	—
ii)	Total ash (on dry basis), percent by mass, *Max*	2·0	5	—
iii)	Acid insoluble ash (on dry basis), percent by mass, *Max*	0·1	8	—
iv)	Total sugar content (as sucrose), percent by mass, *Min*	6·0	—	Cl 8 of IS 6287 : 1985
v)	Starch (on dry basis), percent by mass, *Min*	60·0	—	(*See* Note below)
vi)	Crude fibre (on dry basis), percent by mass	3·0-5·0	12	—
vii)	*p*H of aqueous extract	4·5-7·0	13	
viii)	Cold water solubles (on dry basis), percent by mass, *Max*	12·0	—	Cl 12 of IS 4706 : (Part 1) : 1978
ix)	*Salmonella*	Absent (in 25 g)	—	IS 5887 (Part 3) : 1976
x)	*Escherichia coli*	Absent (in 25 g)	—	IS 5887 (Part 1) : 1976
xi)	Ether extractable matter, percent by mass, *Max*	0·8	—	App F of IS 4684 : 1975
xii)	Lead, mg/kg, *Max*	2·5	—	Cl 13 } IS 6287 : 1985
xiii)	Arsenic, mg/kg, *Max*	1·1	—	Cl 12
xiv)	Tin, mg/kg, *Max*	250·0	—	Cl 16
xv)	Copper, mg/kg, *Max*	30·0	—	Cl 14
xvi)	Zinc, mg/kg, *Max*	50·0	—	Cl 15
xvii)	Mercury, mg/kg *Max*	1·0	—	App H of IS 9808 : 1981
xviii)	Cadmium, mg/kg, *Max*	1·5	—	(Annex B of this standard)

NOTE — Starch shall be calculated by difference, namely:

100 — [Protein percent (on dry basis) + Fat percent (on dry basis) + Total ash percent (on dry basis) + Total sugar percent (on dry basis) + Crude fibre percent (on dry basis)].

ANNEX A

(*Clause* 2)

IS No.	*Title*
1070 : 1977	Water for general laboratory use (*second revision*)
1943 : 1964	A-twill jute bags (*revised*)
2491 : 1972	Code for hygienic conditions for food processing units (*first revision*)
4662 : 1977	Methods for sampling of starch products (*first revision*)
4684 : 1975	Edible groundnut flour (expeller pressed) (*first revision*)
4706 (Part 1) : 1978	Methods of test for edible starches and starch products: Part 1 Physical methods (*first revision*)
4706 (Part 2) : 1978	Methods of tests for edible starches and starch product : Part 2 Chemical methods (*first revision*)
5887	Methods for detection of bacteria responsible for food poisoning:
(Part 1) : 1976	Isolation, identification and enumeration of *Escherichia coli* (*first revision*)
(Part 3) : 1976	Isolation and identification of *Salmonella* and *Shigella* (*first revision*)
6287 : 1985	Methods of sampling and analysis of sugar confectionery (*first revision*)
9808 : 1981	Fish protein concentrate

ANNEX B

[*Table* 1, *Sl No.* (xviii)]

METHOD FOR DETERMINATION OF CADMIUM

B-0 Sample is digested with nitric acid, sulphuric acid and hydrogen peroxide. All reactive metals are extracted from solution, after adjustment to *p*H 9, with dithizone in chloroform. Cadimum is removed by stripping chloroform solution with dilute hydrochloric acid and determined by atomic absorption spectrophotometre at 228·8 nm.

B-1 REAGENTS

B-1.1 Nitric Acid

Low in lead and cadmium.

B-1.2 Hydrogen Peroxide

50 percent.

B-1.3 Citric Acid

Monohydrate, fine crystals.

B-1.4 Thymol Blue Indicator

Triturate 0·1 g indicator in agate mortar with 4·3 ml 0·05 N sodium hydroxide solution. Dilute to 200 ml with water.

B-1.5 Dithizone Solutions

B-1.5.1 *Concentrated Solution*

1 mg/ml in chloroform. Prepare fresh daily.

B-1.6 Standard Cadmium Solutions

B-1.6.1 *Stock Solution*

1·0 mg/ml. Dissolve 1·000 g cadmium, in 165 ml hydrochloric acid and dilute to 1 000 ml with water.

B-1.6.2 *Intermediate Solution*

10 μg/ml. Dilute 10 ml stock solution with 2 N hydrochloric acid to 1 000 ml. Prepare just before use.

B-1.6.3 *Working Solutions*

Dilute 0, 1, 5, 10 and 20 ml intermediate solution to 100 ml with 2 N hydrochloric acid.

B-2 APPARATUS

B-2.1 Atomic Absorption Spectrophotometer

Having hollow-cathode cadmium lamp and 10 cm burner head; wavelength 228·8 nm, range 0-2·0 μg/ml.

B-2.2 Glassware

Thoroughly washed with 8·0 N nitric acid and rinsed with water. Beakers and watchglasses shall be covered during all operations.

B-3 PROCEDURE

B-3.1 Digestion

Weigh 50·0 g sample into 1·5 l beaker. Add several boiling chips or beads, and cover.

Carefully add 25 ml nitric acid, cover, and warm gently with flame to initiate reaction. When reaction subsides, add 25 ml nitric acid, warm again, and continue until 100 ml nitric acid has been added. (Alternatively, add 100 ml nitric acid all at once, with caution, and let it stand at room temperature overnight). Heat until most nitrous oxide fumes have evolved; controlling excessive frothing by cooling or quenching with water from a wash bottle. Only some cellulose and fatty materials, if any, will remain undissolved.

To remove any fat visible in hot solution, cool beaker in ice, and decant clear, aqueous solution from coagulated oils and solids through glass wool pad into 1-l beaker. Add 100 ml water to 1·5 l beaker with fat. Heat, swirl vigorously to rinse fat, chill, and filter as before. Wash funnel and glass wool pad with about 20 ml water.

Add 20 ml sulphuric acid to sample, dilute to about 300 ml with water, and evaporate over flame until charring begins. When charring becomes extensive, cautiously add 50 percent hydrogen peroxide 1 ml at a time. Let reaction subside before adding next portion of oxidant, and never add greater than 1 ml at a time. Continue additions of hydrogen until solution is colourless. Heat vigorously to sulphur trioxide fumes, adding more hydrogen peroxide as required to remove char. Heat vigorously to expel excess peroxide. Cool colourless digest to room temperature.

Prepare reagent blank of 100 ml nitric acid, 20 ml sulphuric acid, and same amounts of water as added to sample. Cautiously add same amounts of 50 percent hydrogen peroxide as above, and remove all nitric acid from blank. Carry blank through same operations as sample.

B-3.2 Extraction

Add 2 g citric acid to cooled digest and cautiously dilute to about 25 ml with water. Add 1 ml thymol blue indicator and adjust to *p*H about 8·8 by slowly adding ammonium hydroxide while cooling in ice bath, until solution changes from yellowish green to greenish blue. Transfer quantity to 250 ml separating funnel using water, and dilute to about 150 ml.

Cool solution, and extract with two 5-ml portions of concentrated dithizone solution, shaking 1-2 minutes each time. Continue extraction with 5-ml portions dilute dithizone solution until last 5 ml portion of dithizone extract shows no change in colour. Combine dithizone extracts in 125-ml separating funnel; wash with 50 ml water, and transfer solvent to another 125 ml separating funnel. Extract with water, wash with 5 ml chloroform and add this to dithizone extracts. Add 50 ml 0·2 N hydrocloric acid to combined dithizone extracts, shake vigorously for 1 minute, and let layers separate. Discard dithizone layer. Wash aqueous solution with 5 ml chloroform and discard chloroform. Quantitatively transfer aqueous solution to 400 ml beaker, add boiling chips, and evaporate carefully to dryness. Carefully rinse down sides of beaker with 10-20 ml water and again evaporate to dryness.

B-3.3 Set instrument to previously established optimum conditions, using air-C_2H_2 oxidizing flame and 228·8 nm resonant wavelength. Dissolve dry residue in 5·0 ml 2 N hydrochloric acid and determine *A* of sample and standard solutions against 2 N hydrochloric acid as blank. Flush burner with water between readings. Use scale expansion controls to obtain 10 × expansion, as convenient. Calculate cadmium from:

Curve of *A* against μg cd/ml:

ppm cd = (μg cd/ml) × (ml 2 N Hcl/g sample)

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